

Job Ready Assessment Blueprint

Electronics Technology



Test Code: 4135 / Version: 01

## General Assessment Information

### Blueprint Contents

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**Test Type:** The Electronics Technology industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of New Jersey, North Carolina, Ohio, and Pennsylvania.



15.0303- Electrical, Electronic and Communications Engineering Technology/Technician



Career Cluster 15- Science, Technology, Engineering, and Mathematics



17-3023.01- Electronics Engineering Technicians



NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE  
University of the State of New York - Regents Research Fund

3 semester hours in Electronics, Introduction to Electrical Engineering Technology or General Technology

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## General Assessment Information (continued)



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!



Electronics Technicians Association® International (ETA®) represents and supports electronics professionals with over 80 industry-recognized and accredited technical certifications. An ETA certification validates the technical knowledge and hands-on skills necessary to be successful in today's electronics industry. Employers worldwide choose ETA-certified professionals because of ETA's certification programs' competency criteria and testing benchmarks that conform to the highest international electronics standards. Students passing NOCTI assessments in the area of electronics, industrial electronics and electronics technology are prime candidates to achieve success earning ETA certifications and will be qualified to enter today's workforce. [www.eta-i.org](http://www.eta-i.org)



INTERNATIONAL SIGN ASSOCIATION

[www.signs.org](http://www.signs.org)

The International Sign Association (ISA) represents manufacturers, suppliers and users of on-premise signs and sign products from all 50 states and around the globe. The sign and visual communications industry is a \$37.5 billion business that employs more than 200,000 individuals. One of ISA's long term goals is to showcase and promote the many exciting and diverse career opportunities that exist within the sign and visual communications industry and to apprise students of the abundant employment opportunities that are present to skilled and qualified candidates. ISA strongly encourages and supports students that work to enhance their educational achievements by completing NOCTI assessments.

## Written Assessment

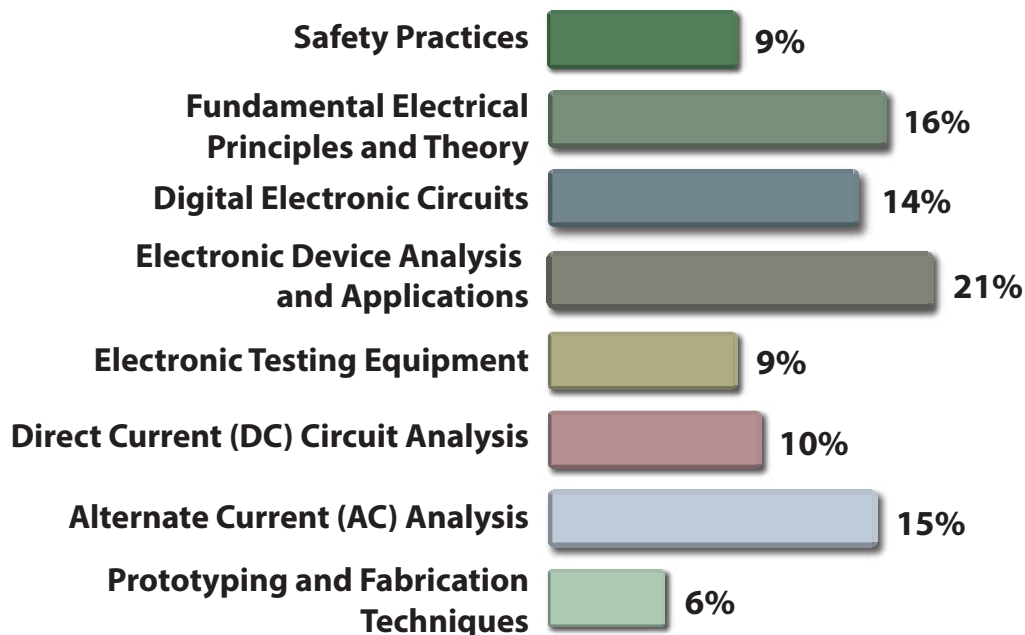
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 182

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered



## Specific Standards and Competencies Included in this Assessment

### Safety Practices

- Demonstrate safe working procedures
- Explain the purpose of OSHA and how it promotes safety on the job
- Identify electrical hazards and how to avoid or minimize them in the workplace
- Explain safety issues concerning lockout/tagout procedures
- Safely discharge electronic equipment

### Fundamental Electrical Principles and Theory

- Explain basic electrical theory, including Ohm's Law, Watt's Law, Kirchhoff's Law
- Describe magnetism and electromagnetism
- Identify schematic symbols
- Identify sources of electricity, including renewable sources
- Interpret component values
- Describe conductors, resistors, insulators, and semiconductors
- Apply proper engineering notations; SI and metric prefixes

### Digital Electronic Circuits

- Identify and compare digital to analog signals and circuits
- Demonstrate knowledge of different number systems
- Convert between different number systems
- Demonstrate knowledge of fundamental logic gates and functions
- Demonstrate knowledge of Boolean logic
- Demonstrate knowledge of sequential logic (flip flops)
- Demonstrate knowledge of digital circuitry



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## Specific Standards and Competencies (continued)

### Electronic Device Analysis and Applications

- Identify diodes, rectifiers, and power supply circuits
- Identify bipolar transistors and bipolar transistor circuits
- Demonstrate knowledge of Field Effect Transistors (FETs) and FET circuits
- Demonstrate knowledge of thyristors and control circuits
- Identify optoelectronic devices and light functions
- Identify Op-Amps, principles, and applications
- Describe circuit protection methods including Electromagnetic Interference (EMI)
- Interpret a manufacturer's data sheet

### Electronic Testing Equipment

- Identify, select, and demonstrate proper hand tool use
- Display knowledge and proper use of multimeters
- Display knowledge and proper use of oscilloscopes
- Display knowledge and proper use of function generators, frequency counters, and testers

### Direct Current (DC) Circuit Analysis

- Analyze and troubleshoot DC series circuits
- Analyze and troubleshoot DC parallel circuits
- Demonstrate knowledge of inductors and capacitors in DC circuits
- Analyze and troubleshoot DC combination circuits



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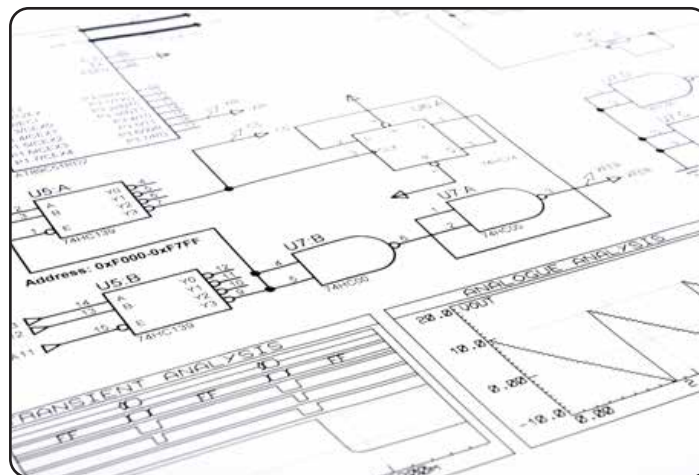
## Specific Standards and Competencies (continued)

### Alternating Current (AC) Analysis

- Analyze AC circuits and waveforms
- Troubleshoot an AC circuit
- Demonstrate knowledge of inductance, capacitance, and resonance
- Identify, analyze, and troubleshoot filter circuits
- Explain current and voltage phase relationships
- Describe the operation of transformers, including troubleshooting

### Prototyping and Fabrication Techniques

- Layout components on a printed circuit board according to a schematic
- Demonstrate knowledge of proper soldering and de-soldering techniques
- Repair or replace a component or foil on a printed circuit board



## Sample Questions

### **SDS stands for**

- A. Safety Data Sheet
- B. Synchronization Dynamic Status
- C. Series Data Strand
- D. Source Dimensional Standard

### **Impedance is measured in**

- A. farads
- B. joules
- C. henries
- D. ohms

### **The binary numbering system is base**

- A. two
- B. four
- C. eight
- D. ten

### **What does an FET do?**

- A. makes the silicon on PCBs
- B. amplifies weak signals
- C. maintains a stable voltage
- D. works in parallel with a capacitor

### **Which meter is always wired in series?**

- A. ohmmeter
- B. ammeter
- C. wattmeter
- D. voltmeter

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## Sample Questions (continued)

**An increase in frequency across an inductor would \_\_\_\_\_ its inductive reactance.**

- A. decrease
- B. increase
- C. dampen
- D. nullify

**The capacitive reactance of a 0.1  $\mu\text{F}$  capacitor at 1 kHz equals**

- A. 1  $\text{k}\Omega$
- B. 1.6  $\text{k}\Omega$
- C. 2  $\text{k}\Omega$
- D. 3.2  $\text{k}\Omega$

**A darkened dot on a schematic where two or more lines cross means**

- A. a hole should be drilled in the printed circuit board
- B. a node exists and the components are connected
- C. the copper trace should be widened to carry more current
- D. that point on the circuit board connects directly to ground

**Optocouplers transfer electrical signals between two isolated circuits by using**

- A. current
- B. fusion
- C. light
- D. magnetism

**Use an isolation transformer to**

- A. separate earth ground from chassis ground
- B. separate earth ground from RF ground
- C. connect earth ground to the chassis ground
- D. connect earth ground to the RF ground

## Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 2 hours and 55 minutes

**Number of Jobs:** 4

### Areas Covered:

#### 26% Soldering and De-Soldering

Participant will select components, solder and de-solder using appropriate tools, and adhere to safety procedures.

#### 23% Power Supply Construction and Circuit Analysis

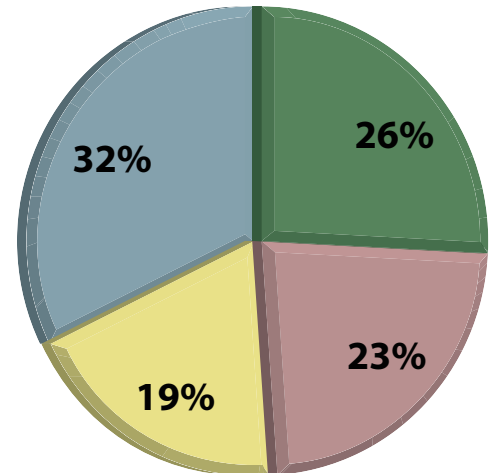
Participant will select components, use tools and equipment correctly following safety procedures, construct circuit with correct measurements, install capacitors, and measure voltages.

#### 19% Operational Amplifier Construction and Analysis

Participant will select correct components, use tools and equipment properly following safety procedures, measure output voltage, display input versus output, and calculate and measure gain.

#### 32% Design and Build a Combinational Logic Circuit

Participant will develop and simplify a Boolean expression, draw the gate logic diagram, and build and test the circuit.



## Sample Job

**Power Supply Construction and Circuit Analysis**

**Maximum Time:** 45 minutes

**Participant Activity:** The participant will refer to the diagram provided and build the circuit, choose proper components from the selection given, measure and record the full RMS Secondary Voltage, measure the DC voltage and record the correct polarity from X to the ground and from Y to the ground.

